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same parasite and emphasizes the dangerous nature of it when present in man. In the East (Japan, Formosa, etc.) it occurs in a large percentage of the population. A third paper<sup>4</sup> records the presence of *Distomum felinum* in the cats sacrificed to science in the University of Nebraska. In this paper, Dr. Ward discusses the value of measurements and concludes that they are of little value; "the topographical relations alone are fixed and hence are the only points on which species may be founded."

PROTOCHORDATA.—A species of Enteropneustan has been discovered upon the shores of New South Wales. It is described by its finder, J. P. Hill, under the name *Ptychodera australiensis* (Proc. Linn. Soc. N. S. Wales, Nov. 28, 1894).

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## ENTOMOLOGY.<sup>1</sup>

**Distribution of Injurious Insects.**—In an interesting paper upon this subject before the Entomological Society of Washington, Mr. L. O. Howard said: "It is reasonable to suppose that in many cases insects will be unable to follow their food-plants to the limits of their possible range, notwithstanding the fact that the geographical distribution of animals and plants is governed by the same general laws of temperature, humidity, exposure, and geological characteristics. The obvious reason for this is, that purely artificial features are introduced in cultivating plants, varieties are propagated which develop resistant powers lacking in the parent stock; seeds, in the case of annuals, are carefully collected and selected, the soil is prepared for their reception, and is artificially fertilized; while with perennials the same general care is taken. It follows, therefore, that the natural range of cultivated species is widely extended in every direction, and in the teeth of the very barriers which naturally would have held them rigidly in check. Plant-feeding insects in general follow the natural distribution of their specific food. Experience has shown that as this natural food becomes a cultivated crop they increase. As the cultivation of the crop is spread along natural lines of distribution, they follow it. When, however, by

<sup>4</sup> Veterinary Magazine, 1895.

<sup>1</sup> Edited by Clarence M. Weed, New Hampshire College, Durham, N. H.

artificial selection, hardy varieties of the crop plant have developed, and the range becomes thus extended along what may be termed unnatural lines, with certain species, at least, and within certain limits with them, their insect enemies will naturally be unable to follow them. The result will be, theoretically, natural selection with the insects trying to catch up with the results of artificial selection with the plants."

**An All-purpose Net.**—There is no doubt but that a special net for each kind of collecting will give the best results, but while the net becomes better suited to one purpose it becomes at the same time less suited to other purposes. A specialist will adopt a special net, but an ordinary collector will want an all-purpose net even if not quite the best for each insect.

The net we have found to meet best the requirements of an all-purpose net is one consisting of a strong but light brass hoop about a foot in diameter, soldered firmly into the end of a brass or tin ferrule. This ferrule should be about six inches long to serve as a handle when beating, when long handle is removed.

The bag of the net should be of strong but light cloth as a good muslin or swiss. It should be about two feet deep, and taper gradually from the mouth to the bottom where it should be two or three inches wide. This will enable one to easily remove an insect with the cyanide bottle or with the hand, and facilitates the clearing of the net by reversing it.—*Entomologists Post-Card*.

**Picobia villosa** (Hancock) is *Syringophilus bipectinatus* (Heller).—In the number of April, 1895 of THE AMERICAN NATURALIST (Vol. XXIX, p. 382–384, plate XXII), Mr. Joseph L. Hancock describes and figures as "a new Trombidian" a species of *Cheyletinæ* already well known in Europe. His *Picobia villosa* does not differ from *Syringophilus bipectinatus* Heller.

Mr. J. L. Hancock is not acquainted with the modern literature on interesting type. In a communication made, in 1884, before the *Académie des Sciences de Paris*<sup>2</sup>, I have shown how this form is common on the birds of all orders. It lives in the quill of the feathers of the wings, and comes out but rarely.

The *Syringophilus bipectinatus* and its variety *major* have been figured by Professor Antonio Berlese, from my preparations, in his great work entitled: *Acari, Myriopoda et Scorpiones Italiani* (fasc. XXXVII, n° g et 10, 2 pl.).

<sup>2</sup> TROUËSSART *Sur les Acariens qui vivent dans le tuyau des plumes des Oiseaux*, —(Comptes-Rendus Acad. des Sciences de Paris, XCIX, (1884), p. 1130).

This Acarid has been found in the interior of the quills of the wings (*rémiges et couvertures alaires*) on the domestic hen (*Gallus domesticus*), on the sparrow (*Passer domesticus*), and on a great number of other birds belonging to the genera:—*Syrnium*, *Eolectus*, *Pæocephalus*, *Chalcopsitta*, *Picus*, *Fringilla*, (var. *major* on *F. montifringilla*), *Emberiza*, *Linota*, *Coccothraustes*, *Troglodytes*, *Anthornis*, *Parus*, *Orites*, *Turdus*, *Hirundo*, *Caprimulgus*, *Trogon*, *Phasianus*, *Meleagris*, *Gallinago*, *Aramus*, *Strepsilas*, *Vanellus*, *Totanus*, *Tringa*, *Anthropoides*, *Sterna*, *Hydrochelidon*, *Larus*, *Anas*, etc.

From this list, we see that the species may be considered as universally dispersed and really cosmopolite. If we compare the types of these various origins, we find no other difference than the size.

The form found by Mr. J. L. Hancock upon the flycatcher (*Phænopepla nitens* Fer.), is absolutely the same that the typical *Syringophilus bipectinatus* from Europe. It cannot be placed in the genus *Picobia* (Haller) which possesses for differential characters:—*Pedes dissimiles; primi et secundi paris tarsus cirro longo, bifido, terminatus; tertii et quarti paris tarsus, unguibus binis recurvis et pectine duplici (pulvillo) instructus*.

On the contrary, the type figured by Mr. Hancock has the characters of the genus *Syringophilus*:—*Pedes omnes similes, unguibus binis recurvis et pectine duplici instructi*. This type is then connected with this last genus.

I must add that, from my observations, the form named "*Syringophilus*" is not adult and represents only the *syringobial* and *parthenogenetic* form of a species of *Cheyletus* described by Doctor S. A. Poppe (from Vegesack) under the name of *Cheyletus nörneri*<sup>3</sup>, which is found also in the quills of the feathers of the birds enumerated previously, feeding on the Sarcoptids (*Analgesinæ*) which live there habitually.

I have lately<sup>4</sup> drawn the attention of naturalists to the habits of these various syringobial forms, and I have shown that the *Cheyletus nörneri* (Poppe), which devoured the *Pterolichi* and *Syringobieæ* which live in the quill, never touches the *Syringophili*, doubtless by virtue of the saying: "*les loups ne se mangent pas entre eux*."

<sup>3</sup> S. A. POPPE, *Über parasitische Milben* (Abhandl. Naturw. Ver. Bremen, [1887] X, p. 239, pl. II, fig. 4-5)

<sup>4</sup> E. TROUESSART, *Sur le Mimétisme et l'instinct protecteur des Syringobies* (Bulletin de la Société Entomologique de France, 1894, p. CXXXVI).—*id.*, *Sur la Parthénogenèse des Sarcoptides plumicoles* (Comptes-Rendus de la Société de Biologie, 26 Mai, 1894:—C.-R. Académie des Sciences, CXVIII, p. 1218).

It is not possible to find any differential sexual character between the two forms distinguished by Mr. Hancock as male and female. The form figured (plate XXII) is the syringobial nymph, and the other the parthenogenetic female.

In the interior of the quill, the *Syringophili* feed, according to the manner of the *Analgesinæ*, on the marrow (or pith) of the feathers. The transformation into adult *Cheyletus* takes place likely out of the quill, which explains why the syringobial form is found, but rarely, in the plumage, outwardly to the feathers, as in the case observed by Mr. Hancock.

As to the *Syringophilus uncinatus* Heller, it is a true *Cheyletus*.

In summary :

1. *Picobia villosa* (Hanock)=*Syringophilus bipectinatus* (Heller).
2. *Syringophilus bipectinatus* is a syringobial form of *Cheyletus nörneri* (Poppe).—Dr. E. L. TROUSSERT, Paris, France.

**Preparing Orthoptera.**—In Special Bulletin No. 2 from the Department of Entomology of the University of Nebraska Prof. Lawrence Bruner gives excellent directions for collecting and preserving Orthoptera. Regarding the process of “stuffing” he says:—“Within the past few years most of the objections that had so frequently been made to the gathering and preservation of orthopterous insects, have practically been removed by the adoption of different and better methods of preparing and preserving these creatures. A few of our specialists only seem to have profited from the discovery that these insects can be handled ‘taxidermically,’ *i. e.*, be stuffed in a similar manner as we would adopt for birds, reptiles and mammals, and thereby preserved in collections equally well with other forms. The following directions for collecting, cleaning and ‘stuffing’ orthopterous insects may, therefore, be of much value to those who contemplate making collections of and studying these insects. Instead of throwing the specimens in spirits (alcohol, brandy, whisky, etc.), when captured they should be killed in the ‘cyanide’ bottle from which they should be removed soon after death, and at once opened, cleaned and stuffed; or they can be transferred to a small tin or other box where they may be kept moist and flexible till arrived at home or in camp. Now take the specimens, one at a time, in the left hand, and with a fine, sharp-pointed scissors open the abdomen by cutting across the middle of the two basal segments on the lower side, then reverse and cut the opening a trifle larger by nearly severing the third segment. After this has been done extract all of the insides (intestines, crop, ovaries, etc.), along with the juices,

using a fine pointed forceps for the purpose, wipe out the inside of the insect with a small wad of cotton and it is ready to be 'stuffed' or filled up. When this latter is done the insect may be either pinned into a box prepared for the purpose at once, or it can be wrapped in paper and packed away for future use. To 'stuff' cut some cotton bat (raw cotton) in short pieces and fill up the insect through the opening previously made for cleaning it, using the same or a similar pair of forceps for the purpose, taking care not to fill too full nor to stretch the abdomen beyond its original dimensions. When the filling is completed carefully draw the edges of the several segments together and gently press the sides of abdomen into shape with the fingers. This can all be done, after a little practice, in about four or five minutes time. The advantage in favor of a specimen thus handled are several. It will not decay nor turn dark, the original colors will be retained more nearly perfect, and there is but little danger under ordinarily careful treatment of its being attacked in future by the museum pests mentioned. Specimens when thus prepared by an expert and properly labeled are easily worth three or four times as much for cabinet specimens as those not so cared for. Especially is this true with reference to specimens collected in warm, moist climates where decay is rapid, and where mould is sure to attack specimens that are long in drying."

**Recent Literature.**—Mr. H. G. Barber of the University of Nebraska publishes an interesting list<sup>5</sup> of Nebraska butterflies. One hundred and thirty-seven species are enumerated.

Mr. W. A. Snow contributes three dipterological papers to the Kansas University Quarterly for January, 1895. Professor S. W. Williston also contributes a paper on Exotic Tabanidæ to the same issue.

Mr. G. C. Davis publishes as Bulletin 116 of the Michigan Agricultural College Experiment Station a 24 page discussion of Insects of the Clover Field.

Prof. Lawrence Bruner discusses in 75 pages of the Nebraska Horticultural Report for 1894 the Insect Enemies of the Apple Trees and its Fruit.

In Bulletin 109 of the New Jersey Station Prof. J. B. Smith discusses cut worms, the sinuate pear-borer, the potato stalk borer and the insecticidal value of bisulphide of carbon. In Bulletin 106 the San José Scale is treated of.

<sup>5</sup> Proc. Nebr. Acad. Sci. IV, pp. 16-22, 1894.

Part IV of the valuable Bibliography of America Economic Entomology has been recently issued by the Department of Agriculture. It includes authors from A to K, and shows the same careful compilation by Dr. Samuel Henshaw as the previous issues of the series.

An important Report upon the Parasitic Hymenoptera of the Island of St. Vincent by Messrs. Riley, Ashmead and Howard has recently been issued by the Linnæan Society (*Journal Zoology*, XXV, pp. 55-254). The material was collected by Mr. H. H. Smith, and contained six new genera and 299 new species.

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## EMBRYOLOGY.

**Origin of Twins.**—Jacques Loeb of the University of Chicago contributes to the fourth part of Roux's new periodical—*Archiv. für Entwicklungsmechanik der Organismen*—an illustrated article in which the results of his experiments upon echinoderm eggs are set forth along with a hypothesis of the mechanical origin of double embryos.

He found that when the eggs of the sea-urchin "*Arbacia*" were put into water less salt than normal the membrane might burst as if from osmotic pressure and part of the egg protoplasm ooze out from the rent. In case this extruded part remained in continuity with the rest of the egg farther development might result in the formation of a double larva.

Many most interesting double and triple larvæ so produced are figured with the abnormal skeletal structures seen in them.

The author then adopts the ideas of Quincke in an attempt to explain the production of double monster in general and in the higher animals in special.

Quincke regarded certain protoplasm movements as similar to those of oil and water when mixing in the presence of soda or of albumen. In such cases more or less violent "extension currents" are produced: currents which Bütschli would assume in the movements of the pseudopodia of an amœba on his hypothesis that protoplasm has a vesicular structure.

Professor Loeb assumes that mechanical currents are normally present in the process of cleavage and that in the abnormal process of double formation there is, for various unknown reasons, an exagger-